WHAT IS CLAIMED IS

1. An electrode, suitable for use in a fuel cell, comprising

a) a catalytic layer, and

b) a diffusion control layer in contact with said catalytic layer.

2 The electrode of claim 1 further comprising a second diffusion control layer in contact with said catalytic layer, so that said catalytic layer is sandwiched between said diffusion control layer and said second diffusion control layer.

3 The electrode of claim 1 wherein said catalytic layer includes platinum.

4 The electrode of claim 3 wherein said catalytic layer further includes at least one metal from the group consisting of ruthenium, nickel, cobalt, tin and molybdenum.

5. The electrode of claim 1 wherein said catalytic layer is configured to catalyze oxidation reactions.

6. The electrode of claim 1 wherein said catalytic layer is attached to a conductive substrate.

7. The electrode of claim 6 wherein said conductive substrate is a conductive mesh

8 The electrode of claim 6 wherein said conductive substrate is made of one of the group consisting of nickel, gold, and a non-conductive substrate coated with a conductive material.

9 The electrode of claim 1 wherein said diffusion control layer is made of carbon paper.

10. The electrode of claim 9 wherein said carbon paper is modified to increase hydrophilicity.

11. The electrode of claim 10 wherein said modification includes impregnation with polyvinyl alcohol.

12. The electrode of claim 1 wherein said diffusion control layer is made of fiber fleece.

3. The electrode of claim 1 wherein said diffusion control layer is a microporous film.

14 A fuel cell for the generation of electrical power, comprising

a) a fuel composition contained within a fuel chamber;

b) an anode having a catalytic layer and a diffusion control layer, said diffusion control layer interposed between said fuel chamber and said catalytic layer and in contact with said catalytic layer; and

c) a cathode.

15. The fuel cell of claim 14 further comprising an electrolyte configured to transport ions from said anode to said cathode.

16. The fuel cell of claim 15 wherein said electrolyte is solid.

17. The fuel cell of claim 16 wherein said electrolyte is a proton exchange membrane.

18. The fuel cell of claim 15 wherein said electrolyte is selected from the group consisting of a liquid, a gel and a suspension.

19. The fuel cell of claim 18 wherein said electrolyte has a pH above about 7.

20. The fuel cell of claim 19 wherein said electrolyte is substantially an aqueous solution of an alkali metal hydroxide.

21. The fuel cell of claim 20 wherein said alkali metal hydroxide is selected from the group consisting of KOH and NaOH.

22 The fuel cell of claim 20 wherein said electrolyte has an alkali metal hydroxide concentration of between about 3 M and about 12 M.

23. The fuel cell of claim 22 wherein said concentration is substantially 6 M.

24. The fuel cell of claim 18 wherein exhaust gases produced in the fuel cell are substantially soluble in said electrolyte

25. The fuel cell of claim 14 wherein said fuel composition comprises a fuel and an electrolyte

26 The fuel cell of claim 25 wherein said electrolyte has a *pH* above about 7.

27. The fuel cell of claim 26 wherein said electrolyte is substantially an aqueous solution of an alkali metal hydroxide.

28. The fuel cell of claim 27 wherein said alkali metal hydroxide is selected from the group consisting of KOH and NaOH.

29. The fuel cell of claim 28 wherein said electrolyte has an alkali metal hydroxide concentration of between about 3 M and about 12 M.

30. The fuel cell of claim 29 wherein said concentration is substantially 6 M

31. The fuel cell of claim 24 wherein said fuel includes an alcohol.

32. The fuel cell of claim 31 wherein said alcohol is methanol.

33. The fuel cell of claim 24 wherein said fuel composition further comprises a viscosity-controlling component.

34. The fuel cell of claim 33 wherein said viscosity-controlling component includes at least one compound from the group consisting of glycerine, ethylene glycol and polyethylene glycol.

35 The fuel cell of claim 14 wherein said diffusion control layer is configured to allow diffusion of said fuel composition from said fuel chamber through said diffusion control layer to said catalytic layer at a rate less than a rate of oxidation of said fuel at said catalytic layer.

36. The fuel cell of claim 14 further comprising a valve mechanism configured so as to selectively block and unblock flow of said fuel from said fuel chamber to said anode.

37. The fuel cell of claim 14 wherein exhaust gases produced in the fuel cell are substantially soluble in said fuel composition.

38. A method to regulate power output of a fuel cell with an anode comprising:

a) providing a fuel with a viscosity;

b) providing a layer with a permeability through which said fuel must diffuse to make contact with the anode; and

c) adjusting said viscosity and said permeability to regulate a rate of diffusion of said fuel to the anode.